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Re-examination of the Himalayan Tethys Sedimentary Sequence

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The central zone of the Himalayan Orogen is occupied by the Tethys Sedimentary Sequence, the Higher Himalayan Gneisses, and the Lesser Himalayan Metasediments juxtaposing with mega faults, being distributed parallel to the mountain range. The lower part of the Tethys Sedimentary Sequence (Neoproterozoic - Cambrian) has been known to be in the unconformity/disconformity relationship with the upper part of the sequence (Ordovician - Eocene) in wide areas along the orogen (e.g., Garzanti et al., 1986; Valdia, 1995; Myrow et al., 2006, 2009). The Tethys Sedimentary Sequence and the Higher Himalayan Gneisses are generally regarded to be juxtaposed with the South Tibetan Detachment fault. However, a gradual relationship including stratigraphic continuity and/or metamorphic gradation has been known from some areas (e.g., Fuchs, 1973/74; Motegi, 2001; Myrow et al., 2003). In relation to the above, Pan-African orogeny in the Himalaya has also been identified by several authors (e.g., Valdia, 1995; Godin, 2003; Gehrels et al., 2006; Yoshida & Upreti, 2007), and the global tectonic set-up of the orogeny has come to be considered (Cawood et al., 2007; Yoshida, 2011).

Based on the evidence and arguments above, the authors propose the terms “Infra Tethys Super Group” and the “Tethys Super Group” to the lower part (Neoproterozoic to Cambro-Ordovician) and the upper part (Middle Ordovician to Eocene) of the so far called Tethys Sedimentary Sequence mentioned above. The protolith of the Higher Himalayan Gneisses is considered to be the Infra Tethys Super Group (e.g., Myrow et al., 2003), taking into account the idea that the gradational relationship between the Infra Tethys Super Group and the Higher Himalayan Gneisses mentioned above represents their original relationship before the detachment. The minimum age of the base of the Infra Tethys Super Group is considered to be the earliest Neoproterozoic (Gehrels et al., 2006).

There are some reports that some formations of the Infra Tethys Super Group are considered to be same as some formations of the Lesser Himalayan Metasediments (Kumar, 1994; Motegi, 2001: Steck, 2003; Myrow et al., 2003; 2006). If so, it is considered that the Infra Tethys Super Group generally conformably overlie the Lesser Himalayan Metasediments in their original structure, before they were separated by the intrusion of the thrust sheet of the Higher Himalayan Gneisses. Taking into account the above idea that the Infra Tethys Super Group is gradational with the Higher Himalayan Gneisses, the idea that the Tethys Super Group, Infra Tethys Super Group, Protolith sedimentary pile of the Higher Himalayan Gneisses, and the Lesser Himalayan Metasediments originally deposited more or less successively along the northern margin of proto Indian subcontinent (Myrow et al., 2003). Shanker et al. (2000) considered that the lower part of the Tethys Sedimentary Sequence (the Infra Tethys Super Group) and the Lesser Himalayan Metasediments formed a part of the Purana Basins sediments formed in the Proto Tethys sea which covered most of the Proto Indian subcontinent and extended northward during the Mesoproterozoic to early Cambrian. It is noted that the above idea is related to the investigation of the protolith of Pan-African high-grade metamorphic rocks of Gondwana.

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